

## Claims

1. A chemically processing apparatus using a combination of a first solvent and a second solvent, where the compatible state and the separated state are reversibly changeable in a manner dependent on the temperature, the apparatus including a container for mixing together a first solvent solution prepared by dissolving a starting material of a chemical process and/or a substance to be involved in a reaction of the chemical process in a first solvent and a second solvent solution prepared by dissolving the starting material of the chemical process and/or the substance to be involved in the reaction of the chemical process in a second solvent, a first temperature control measure for controlling the temperature of one partial region inside the container to a temperature where the first solvent solution and the second solvent solution are at a compatible state or a higher temperature, and a second temperature control measure for controlling the temperature of the other partial region inside the container to a temperature where the first solvent solution and the second solvent solution are at a phase-separated state or a lower temperature.
2. The chemically processing apparatus according to claim 1, where a catalyst for the reaction of the chemical process is arranged in one partial region under temperature control

with the first temperature control measure.

3. The chemically processing apparatus according to any one of claims 1 and 2, where a measure for giving energy to give energy to promote the reaction of the chemical process is arranged in one partial region under temperature control with the first temperature control measure.

4. The chemically processing apparatus according to claim 3, where the energy given with the measure for giving energy includes at least one of photoenergy, electrical energy, sound energy, mechanical vibration energy, electromagnetic energy and radiation energy, except thermal energy to be given for temperature control.

5. The chemically processing apparatus according to any one of claims 1 through 4, where one partial region under temperature control with the first temperature control measure is positioned upward the other partial region under temperature control with the second temperature control measure.

6. The chemically processing apparatus according to any one of claims 1 through 5, where one partial region or the other partial region is in the vicinity of the inner wall of the container while the inner wall of the container or the outer wall of the container is temperature-controlled with the first or second temperature control measure.

7. The chemically processing apparatus according to any one

of claims 1 through 6, the chemically processing apparatus including one or more reaction chambers with one or more separators inside the container, where one partial region or the other partial region is in the vicinity of the separators of the reaction chamber and the separators are temperature-controlled with the first or second temperature control measure.

8. The chemically processing apparatus according to claim 7, where the container is of a double-tube structure comprising the inner tube and the outer tube arranging the inner tube inside, while the separators are a part or the whole of the tube walls of the inner tube and the outer tube.

9. The chemically processing apparatus according to claim 7, where the container has a structure where plural parallel planes form a space and the separators are a part or the whole of the parallel planes.

10. The chemically processing apparatus according to any one of claims 1 through 9, the chemically processing apparatus containing a flow measure of solvent solutions, which works for first and second solvent solutions to flow from one partial region to the other partial region and/or for the first and second solvent solutions to flow from the other partial region to one partial region.

11. The chemically processing apparatus according to any one of claims 1 through 10, where the substance to be involved in

the reaction of the chemical process is a catalyst soluble in either one of the first solvent and the second solvent but hardly soluble in the remaining one of the first solvent and the second solvent and the reaction of the chemical process is a synthetic reaction of a compound, utilizing the catalyst.

12. The chemically processing apparatus according to any one of claims 1 through 10, where the substance to be involved in the reaction of the chemical process is a carrier compound of a peptide soluble in either one of first and second solvents and hardly soluble in the remaining one of the first and second solvents and the reaction of the process is a peptide synthesis reaction for binding sequentially amino acids onto the carrier compound.

13. The chemically processing apparatus according to claim 4, where the energy to be given is photoenergy and the measure for giving photoenergy comprises a source generating light and an optically transmitting substance as a part or the whole of a container material, or an optically wave guide measure with a wave guide end in one partial region inside the container, so that the photoenergy from the source generating light is given through the optically transmitting substance or the optically wave guide measure to the one partial region.

14. The chemically processing apparatus according to claim 4, where the energy to be given is electrical energy and the measure for giving electrical energy includes an electrode for

electrochemical reaction, as a cathode arranged in one partial region inside the container and an outer electric source in electric connection with the electrode.